



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**B.Sc. DEGREE EXAMINATION – CHEMISTRY**

**SIXTH SEMESTER – APRIL 2013**

**CH 6608/CH 6602 - CHEMISTRY OF MATERIALS**

Date: 30/04/2013  
Time: 1:00 - 4:00

Dept. No.

Max. : 100 Marks

**PART – A**

**Answer ALL questions:**

**(10 x 2 = 20 marks)**

1. Distinguish between amorphous and crystalline solids.
2. What are Miller indices? Sketch the plane in a cube having Miller indices 111.
3. What quantity is measured in TGA and in DTA?
4. Explain how heating rate will affect the thermogram of TGA.
5. What are the advantages of organic semiconductor?
6. How do conductivities of metals and semiconductors vary with the temperature?
7. What are permanent and temporary magnets?
8. State Curie-Weiss law.
9. What Cooper pairs?
10. Mention any two applications of superconductors.

**PART – B**

**Answer any EIGHT questions:**

**(8 x 5 = 40 marks)**

11. Define Bravais lattice and explain with an example.
12. Draw the projection of unit cells of the following and explain the salient features of their structures.  
a. Zinc blende and b. fluorite
13. The ionic radii of  $Rb^+$ ,  $Br^-$  and  $I^-$  ions are 1.47, 1.95 and 2.16 Å respectively. Predict the most probable type of geometry exhibited by  $RbBr$  and  $RbI$  on the basis of radius ratio rule.
14. Describe the sol-gel preparative method of metal oxides.
15. What is SEM? Give its applications.
16. Write a note on piezo and pyroelectrics.
17. Explain the functioning of a photovoltaic cell.
18. How magnetic susceptibility of a material determined?
19. Distinguish between paramagnetism and diamagnetism.
20. Explain how sodium-sulphur battery functions.
21. What are type I and type II superconductors?
22. Describe Meissner effect.

**PART - C**

**Answer any FOUR questions**

**(4 x 10 = 40 marks)**

23. Describe the X-ray powder method of analysis and indexing of X-ray diffraction lines.
24. a) Of the two, which is a normal spinel and which is an inverse spinel?  $NiCr_2O_4$  and  $NiFe_2O_4$ .  
b) Write a note on Chevrel phases.
25. Write a detailed account of i. Chemical vapor deposition method and ii zone refining.
26. Discuss in detail the following types of defects. i. Frenkel defect and ii. Schottky defect.
27. Sketch and explain the variation of magnetic susceptibility of paramagnetic ferromagnetic and antiferromagnetic materials with temperature.
28. Give an account of smectic, nematic and cholesteric liquid crystals.

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